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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/083,996	02/25/2002	Akihiko Nagano	1232-4825	5742

27123 7590 10/03/2003

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EXAMINER	
YAM, STEPHEN K	
ART UNIT	**PAPER NUMBER**
2878	

DATE MAILED: 10/03/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/083,996	NAGANO, AKIHIKO	
	Examiner	Art Unit	
	Stephen Yam	2878	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03 July 2003* .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-36* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-36* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

DETAILED ACTION

This action is in response to Amendments and remarks filed on July 3, 2003. Claims 1-36 are currently pending.

Specification

1. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed, regarding different light-receiving regions in a pixel.

Claim Objections

2. Claim 33 is objected to because of the following informalities:

In Claim 33, "lens" is misspelled as "lends".

Appropriate correction is required.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 31-35 are rejected under 35 U.S.C. 102(b) as being anticipated by Yamana et al. US Patent No. 5,245,173.

Regarding Claim 31, Yamana et al. teach (see Fig. 10 and 13) an image sensing apparatus in which a plurality (200x200) (see Fig. 13) of pixels (303) for receiving an image formed by an image taking lens unit (301), each of the plurality of pixels (each of the 200x200 from both (323) and (324)) comprising an optical unit (portion of (301, 304, 304') for each pixel) including a lens portion (portion of (301)), a first light-receiving region (323) where a principal ray of the image taking lens unit is incident, and a second light-receiving region (324) where the principal ray is not incident.

Regarding Claim 32, Yamana et al. teach (see Fig. 13) the second light-receiving region including two sub light-receiving regions (left region and right region of each pixel) arranged to sandwich the first light-receiving region (in the transverse direction of the incoming optical beam).

Regarding Claim 33, Yamana et al. teach the lens portion arranged to make light-receiving surfaces of the first and second light-receiving regions and a pupil position of the image taking lens unit to be substantially conjugate to each other (as each 200x200 pixel corresponds to a region on the image taking lens unit, since the image taking lens unit and the light-receiving regions are stationary).

Regarding Claim 34, Yamana et al. teach the two sub light-receiving regions respectively receiving rays from different regions on a pupil region of the image taking lens unit (as each point area on the second light-receiving region corresponds to a specific point region on the image taking lens unit, since the image taking lens unit and the light-receiving regions are stationary).

Regarding Claim 35, Yamana et al. teach a detection circuit (311) arranged to detect a focus state of the image taking lens unit based on outputs of the sub light-receiving regions (see Col. 14, line 67 to Col. 15, line 1).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 1-3, 5, 7-14, 17, 18, and 22-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakahara in view of Applicant's admitted prior art.

Regarding Claim 1, Nakahara teaches (see Fig. 2A) an image sensing element for sensing an image formed by an image sensing lens (inherent in a camera), comprising a pixel (1-1L) which includes a first light-receiving region (6L) that includes a region where a principal ray having passed through the image sensing lens is incident, and a second light-receiving region (1D, 2D) that does not include the region where the principal ray having passed through the image sensing lens is incident (since the region is not in the center of the optical axis). Regarding Claim 18, Nakahara teaches (see Fig. 2A) an image sensing apparatus comprising an image sensing element having a pixel (1-1L) which includes a first light-receiving region (6L) that includes a region where a principal ray having passed through an image sensing lens is incident, and a second light-receiving region (1D, 2D) that does not include the region where the principal ray having passed through the image sensing lens is incident (since the region is not in

the center of the optical axis), and a control unit (100) (see Col. 7, line 63 to Col. 8, line 3) for detecting a focus state of the image sensing lens by using the second light-receiving region, and performing focus adjustment. Regarding Claims 2 and 23, Nakahara teaches the second light-receiving region including two divided light-receiving regions (1D and 2D) sandwiching the first light-receiving region. Regarding Claims 3 and 14, Nakahara teaches (see Col. 5, lines 38-40) the two divided light-receiving regions used to detect a focus state of the image sensing lens. Regarding Claims 5, 13, and 24, it is inherent that two detectors at different locations both perpendicular to the optical axis receive different optical image based on the refraction of the lens, and that the regions sandwich an optical axis formed between the two divided light-receiving regions. Regarding Claims 8 and 25, Nakahara teaches (see Fig. 2A) an interval between the two divided light-receiving regions is relatively narrow at a center of the first light-receiving region and relatively wide at two ends of the first light-receiving region. Regarding Claims 11 and 28, Nakahara teaches (see Fig. 2A) the region formed by the first and second light-receiving regions having a substantially regular polygonal shape (rectangle). Regarding Claims 12 and 29, Nakahara teaches (see Fig. 2A) the second light-receiving region having a shape "substantially" obtained by cutting off each corner of a square. Regarding Claim 30, Nakahara teaches (see Fig. 3) an image processing apparatus (50, 51, 100) comprising the image sensing apparatus in Claim 18. Nakahara does not teach a stop of the image sensing lens in a stopped-down aperture state thereby reducing the degree of decrease in sensor output compared with the sensor output in a full aperture state of the image sensing lens. Applicant's admitted prior art teaches an image sensing lens for a pixel wherein a stop of the image sensing lens is in a stopped-down aperture state thereby reducing the degree of decrease in sensor output compared

with the sensor output in a full aperture state of the image sensing lens (see Page 3, line 17 to Page 4, line 12). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a stop in the image sensing lens in a stopped-down aperture state to reduce the degree of decrease in sensor output, as taught by Applicant's admitted prior art in the element and apparatus of Nakahara, to increase sensitivity and contrast to provide increased focus and exposure detection.

Regarding Claims 7 and 22, Nakahara in view of Applicant's admitted prior art teach the image sensing element and apparatus as taught in Claims 1 and 18, according to the appropriate paragraph above. Nakahara also teaches individually outputting charges in the first and second light-receiving regions. Nakahara does not teach outputting a sum of charges in the first and second light-receiving regions. It is well known in the art to sum the charges in multiple photodetectors, to provide a greater detection area. It would have been obvious to one of ordinary skill in the art at the time the invention was made to sum the charges in the first and second light-receiving regions in the image sensing element and apparatus of Nakahara in view of Applicant's admitted prior art, to provide greater sensitivity for exposure analysis in low-light situations.

Regarding Claims 9, 10, 26, and 27, Nakahara in view of Applicant's admitted prior art teach the image sensing element and apparatus as taught in Claims 1 and 18, according to the appropriate paragraph above. Nakahara does not teach the first light-receiving region is relatively narrow at a center and relatively wide at two ends, or the first light-receiving region narrower than a width of each of the two divided light-receiving regions at a center and wider than the width of each of the two divided light-receiving regions at two ends. It is design choice

as to the shape of the light-receiving regions, to fit the components into a desired physical configuration. It would have been obvious to one of ordinary skill in the art at the time the invention was made to shape the first light-receiving region as narrow at the center and wide at the two ends and the first light-receiving region narrower than that of the two divided light-receiving regions at the center and wider at the ends in the image sensing element and apparatus of Nakahara in view of Applicant's admitted prior art, to fit the regions into a specific dimensional area as desired by design preferences.

Regarding Claims 13 and 17, Nakahara in view of Applicant's admitted prior art teach the image sensing element as taught in Claim 1, according to the appropriate paragraph above. Nakahara does not teach a microlens which causes the two divided light-receiving regions to receive beams from two predetermined regions of the image sensing lens. It is well known in the art to use a variety of lenses to modify the imaging view and concentrate or diverge light beams corresponding to the image. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a microlens to receive beams from two predetermined regions on the imaging lens sandwiching an optical axis in the element of Nakahara in view of Applicant's admitted prior art, to properly shape the incoming image while reducing the size of the element.

7. Claims 4, 6, 15, 16, and 19-21 are rejected under 35 U.S.C. 103(a) as being obvious over Nakahara in view of Applicant's prior art as applied to Claims 1 and 18, further in view of Suzuki et al. US Patent No. 5,751,354.

Regarding Claims 4, 15, and 19, Nakahara in view of Applicant's admitted prior art teach the image sensing element and apparatus as taught in Claims 1 and 18, according to the appropriate paragraph above. Nakahara does not teach the second light-receiving region used to detect a focus state **and** photograph an object. Suzuki et al. teach (see Fig. 1) an image sensing element and apparatus with an image sensing lens (1) and a light-receiving region (4) that detects a focus state (S4) (see Fig. 2), exposure (S2, S11) (see Col. 5, lines 33-40), and photographs an object (S12). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the image sensing element of Suzuki et al. for photographing an object in the image sensing element and apparatus of Nakahara in view of Applicant's admitted prior art, to reduce the number of components in the system and reduce the size of the camera.

Regarding Claims 6, 16, 20, and 21, Nakahara in view of Applicant's admitted prior art teach the image sensing element and apparatus as taught in Claims 1 and 18, according to the appropriate paragraph above. Nakahara also teaches determining the amount of light present in the imaging using the first light-receiving region (see Col. 5, lines 34-41- "photometering"). Nakahara does not teach determining a time in which charges are accumulated in the second light-receiving region. Suzuki et al. teach (see Fig. 1) an image sensing element and apparatus with an image sensing lens (1) and a light-receiving region (4) that detects a focus state (S4) (see Fig. 2), exposure (S2, S11), (see Col. 5, lines 33-40) and determining (S2) a time in which charges are accumulated for the focusing process (S3) (task of the second light-receiving region). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the first light-receiving region to determine a charge-accumulation time for the second light-receiving region (for focusing) as taught by Suzuki et al. in the image sensing element and

apparatus of Nakahara in view of Applicant's admitted prior art, to prevent underexposure or overexposure to the second light-receiving region to achieve accurate focusing results.

8. Claim 36 is rejected under 35 U.S.C. 103(a) as being obvious over Yamana et al.

Yamana et al. teach the apparatus as taught in Claim 31, according to the appropriate paragraph above. Yamana et al. do not teach an adder circuit arranged to add outputs of the sub light-receiving regions and output of the first light-receiving region. It is well known in the art to add the outputs between associated regions of a single pixel, to determine the total light intensity to normalize the light intensities for each pixel for focus calculations. It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide an adder circuit to add the sub light-receiving regions and output of the first light-receiving region in the apparatus of Yamana et al., to analyze the focus contrast for each pixel based on a total light output to provide optimal sensitivity for each pixel.

Response to Arguments

9. Applicant's arguments filed July 3, 2003 have been fully considered but they are not persuasive.

10. Applicant's arguments with respect to claims 1-36 have been considered but are moot in view of the new ground(s) of rejection.

Applicant argues that the Nakahara reference does not teach a pixel as in the present aspect of the present invention, but instead teaches peripheral photometering areas and distance measuring areas. Examiner submits that the light-receiving area of Nakahara (1-1L) is a single pixel as it receives light and converts it to a light intensity signal. A pixel is not limited in size or internal constituents, and is simply a definition of imaging boundaries based upon light input or output. Since the area (1-1L) of Nakahara receives a specific area of light of a scene as defined by an imaging lens, it is considered a pixel.

Thus, as set forth above, this rejection is proper.

Conclusion

11. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stephen Yam whose telephone number is (703)306-3441. The examiner can normally be reached on Monday-Friday 8:30am-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Porta can be reached on (703)308-4852. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)308-0956.

SY

SY

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